

1. Introduction

In the context of further research and development work on turbo-machines, special importance belongs to the experimental investigation of flow phenomena within the blade channels of the rotors. The recently developed noncontiguous optically based velocity measurement techniques offer us today methods for conducting such investigations.

The Laser-Doppler-method is the most established technique, which is already used very successfully in many cases of applicability as there are for example velocity measurements in windtunnels (sub- and hypersonic), in free jets, in liquid flows, in flames and so on.

But there are some considerable difficulties if one applies this method to turbomachines. This is especially true when the machines have small dimensions and if the velocities are in the high speed range. It will be discussed later on, what reasons there are in detail.

Considering this situation we decided to examine other techniques of optical velocity measurement and found a method, which looks to be better suited for turbomachinery applications. The basic idea of this new principle was the first time introduced by Mr. TANNER (ref.1).

Although Mr. Tanners method is only to be use in low turbulent flows we found a modification, called "Dual-Focus-Velocimeter", which allows to measure in any turbulent flows the amount and the